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Deeper Learning in Paraguay: Examining Relations between Student Interpersonal, Cognitive, and Emotional Skills, Outcomes, and Career Aspirations at Escuela Agrícola, Paraguay

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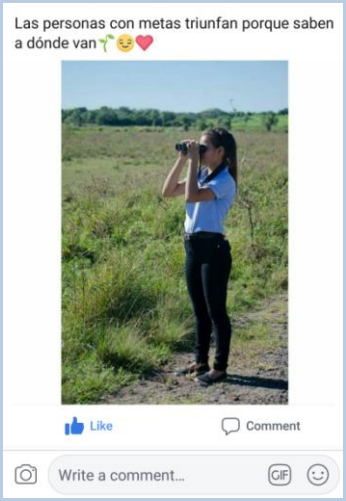

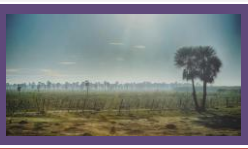

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Major Qualifying Project Report

Submitted to the Faculty of

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by

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Approved by:
Professor Erin Ottmar
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Abstract

This work provides an overview of social, emotional, and cognitive skills of students at Escuela Agrícola, a rural Paraguayan vocational-agricultural high school. Connections between these skills and student outcomes -- including self-efficacy, aggression, academic achievement, and career aspirations -- are analyzed in relation to students' impoverished backgrounds. The results demonstrate the considerable resiliency and accomplishment of these students, especially compared with their local peers. These results also provide a foundation for the school administration and staff to understand and foster the development of students' social, emotional, and cognitive skills and future aspirations.

Acknowledgements

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Summary

Deeper Learning (DL) prepares high school students for success in life. Many methods exist to implement DL; ultimately, it fosters interpersonal skills such as collaboration, intrapersonal skills such as perseverance, and cognitive skills such as complex problem solving. Greater positive outcomes are achieved in schools that implement DL strategies compared with those that do not, including higher core content knowledge, problem solving skills, graduation rates, and enrollment in university. The effectiveness of DL has been well-established in the United States, but the benefits of quality education are of universal importance. Little work has been done in Latin America, especially not in Paraguay, where educational methods tend to remain traditionally focused on rote memorization. One non-traditional Paraguayan school, la Escuela Agrícola de San Francisco (EASF), works to eliminate poverty through vocational-agricultural education for poor, rural teenagers. This research investigated the relationship between DL skills and student outcomes, achievement, and career aspirations, and the role of poverty in each.

91 EASF students completed a survey in their native language, Spanish. The survey, adapted from the Study of Deeper Learning, measured students' competencies in DL constructs as well as in several supplemental constructs, according to the priorities of the school. Specifically, the survey measured collaboration, belonging, perseverance, opportunities for complex problem solving, creative thinking, self management, locus of control, self efficacy, communication, perceived stress, empathy, aggression, and future aspirations. We also measured the poverty status and academic achievement of students. We conducted a variety of statistical analyses to examine the relationships between these measures.

We found that students generally have high self-reported levels of DL competency, with no significant differences between grade levels. Some differences between grade levels in supplemental

constructs include an increase in verbal aggression with age, and high perceived stress in second-year students. Students reported high future aspirations; overall, 68% of students were interested in a STEM-related career and 60% in a career directly related to their vocational program at EASF. After they graduate from high school, 87% of students plan to enroll in university. Poverty affects a significant proportion of these students; 25% live below the national (income-based) poverty line and 65% of their parents did not complete secondary school.

Regression analyses identified few trends predicting student outcomes of aggression, self-efficacy, STEM-related career aspirations, and academic achievement. Most factors measured were not correlated with poverty. Several DL factors significantly affected aggression and efficacy; poverty played no role. No predictors of STEM-related careers were found. Perceived stress was the only factor to significantly impact academic achievement.

Many of these results demonstrate the resiliency and achievement of EASF students despite their difficult backgrounds. The lack of connections between aspirations, achievement, and poverty is good news for EASF and impoverished students everywhere, as their education will enable them to escape poverty. These results provide a foundation for EASF to understand and foster the development of students' social, emotional, and cognitive skills and future aspirations, and adds to the limited educational work in Latin America.

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Critical "non-cognitive skills" such as interpersonal and intrapersonal attributes, social and emotional skills, and self-regulation provide a foundation for lifelong wellbeing (Bridgeland, , Bruce, & Hariharan, 2013; Farrington et al., 2012). Social and emotional skills are recognized not only as important for child development but also as necessary to integrate into classroom instruction (Elias et al., 1997). The Collaborative for Academic, Social, and Emotional Learning (CASEL) presents the Social and Emotional Learning (SEL) framework as five core competencies that must be coordinated through classrooms, schools, homes, and communities (see Figure 1) (CASEL, 2018).

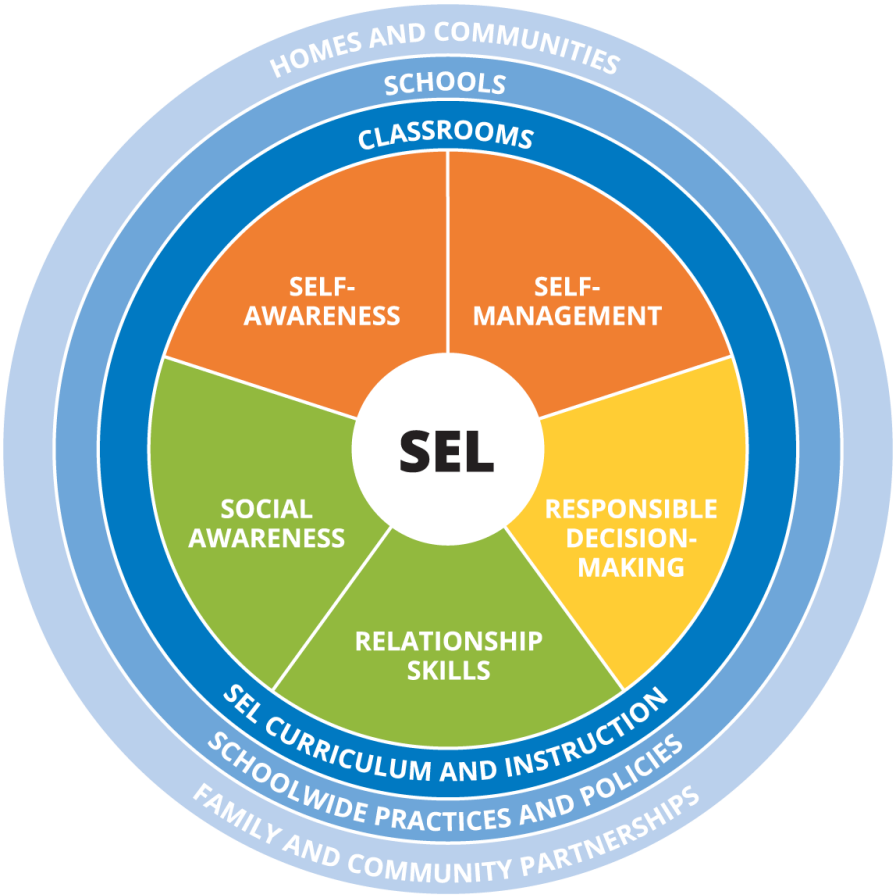

Figure 1. Social and Emotional Learning (SEL) Core Competencies (CASEL, 2018)

Through SEL, children learn self-awareness, self-management, responsible decision-making, relationship skills, and social awareness (CASEL, 2018). These core competencies integrate intrapersonal, interpersonal, and cognitive skills, attitudes, and behaviors that allow students to effectively

deal with life's daily challenges. When students gain competency in self-awareness, they are able to identify their own emotions, recognize their strengths and limitations, and operate with a sense of self-confidence and self-efficacy. Self-management skills allow students to regulate their emotions, manage stress, control impulses, set goals, and motivate themselves. Responsible decision-making involves not only a sense of ethical responsibility, but also the ability to identify, analyze, and solve problems, and reflect upon and evaluate the consequences of various actions. Relationship skills give kids the ability to establish and maintain healthy and rewarding relationships through communication, social engagement, and teamwork. Social awareness involves their ability to understand and respect others from diverse backgrounds through perspective-taking and empathy. As these competencies are mastered, many positive behavioral and academic outcomes are achieved, including positive social behavior, fewer conduct problems, less emotional distress, and improved academic performance (CASEL, 2018).

The effectiveness of this approach has also been well-documented. Through teaching students to recognize and understand their emotions, feel empathy, make decisions, and build relationships, SEL programs have improved children's mental health, social skills, positive self-image, prosocial behavior, and academic success (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Sklad, Diekstra, Ritter, Ben, & Gravesteijn, 2012). In addition, SEL interventions reduce conduct problems of student disruption and emotional distress, antisocial behavior, and substance abuse (Durlak et al., 2011; Sklad et al., 2012).

While SEL is geared towards elementary-aged children, the same skills must be fostered in high school, too; this is known as Deeper Learning (DL). Similarly to SEL, DL organizes opportunities and skills into three main categories: interpersonal, intrapersonal, and cognitive. Interpersonal, or social, skills are those such as collaboration and belonging. Intrapersonal, or emotional skills, include self-management, perseverance, and self-efficacy. Cognitive skills include creative thinking and problem solving. When students develop skills in each of these areas, they are more prepared for future success in their ability

to work well with groups, adapt to new circumstances, and set goals (see Figure 2) (William and Flora Hewlett Foundation, n.d.). Similarly to SEL, many short- and long-term positive benefits result from opportunities for students to grow in these abilities. DL skills prepare students for future success in college, a career, and life.

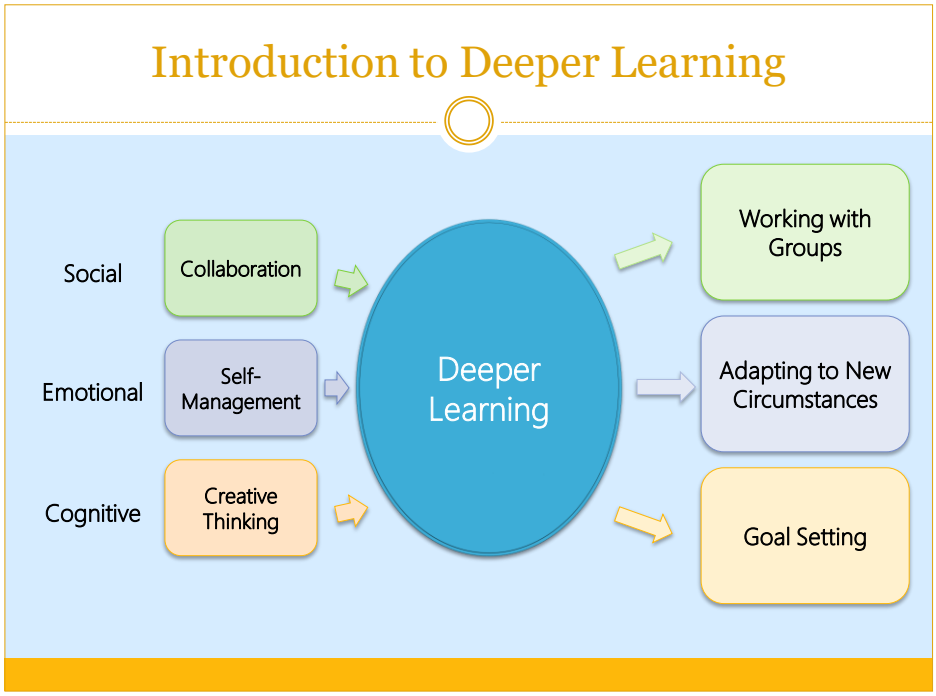

Figure 2. Deeper Learning -- example skills and outcomes

In the *Study of Deeper Learning*, led by the Hewlett Foundation, researchers compared outcomes from a network of schools where DL strategies have been implemented to non-DL network schools. The study found a direct link between students' opportunities for deeper learning and outcomes in interpersonal and intrapersonal competencies (Bitter, Taylor, Zeiser, & Rickles, 2014). Results show that students with more DL opportunities achieved higher core content knowledge and problem solving skills, more positive interpersonal and intrapersonal outcomes, were more likely to graduate on time, and were more likely to enroll in four-year and selective postsecondary institutions (Zeiser, Taylor, Rickles, Garet, & Segeritz, 2014). Furthermore, these effects were equitable between

groups based on race, gender, prior achievement, and socioeconomic status (Bitter, et al., 2014; Huberman, Bitter, Anthony, & O'Day, 2014; Zeiser, et al., 2014).

To create Deeper Learning opportunities, many instructional strategies exist. Project-Based Learning allows students to develop knowledge and skills through the investigation of a real-world problem. Work-Based Learning connects schools with local employers to give students hands-on experience and connect their classroom learning to a work environment. Inquiry-Based Learning emphasizes curiosity and questioning, with a student-driven experimentative approach to finding answers. Personalized Learning allows students, teachers, and parents to collaborate in creating an individualized learning plan for the student, who can then receive appropriate instruction and guidance at their own pace. Throughout the United States, schools utilize these strategies and many others as more schools adopt the DL approach to instruction and assessment (Alliance for Excellent Education, n.d.).

Other constructs of importance in school settings, that are not formally included within DL assessment measures, include aggression, empathy, communication, and stress. Aggression and violence -- known as bullying, in the school context -- are both prevalent and destructive behaviors faced by adolescents worldwide, who are likely to be the victim or aggressor in violent acts (Maguire & Pastore, 1998; Orpinas, Horne & Staniszewski, 2003). In addition to being a crucial life skill that allows people to relate to others, empathy is of particular importance because it can reduce aggression (Sánchez-Pérez, Fuentes, Jolliffe & González-Salinas, 2014). Similarly, communication is an important life skill that allows students to effectively work together and seek nonviolent resolutions to conflict (Kelley, 1979). Generally in academic settings, some level of stress can benefit and even motivate student performance; however, elevated stress levels can be detrimental to performance, health, and well-being (Cohen, Kamarck, & Mermelstein, 1994).

While SEL, DL, and related constructs have been well-established in educational psychology research and in schools within the U.S., their principles are of universal importance. Less work has been done internationally, and more validated scales are needed to measure these constructs in cross-cultural settings (Lopez & Orpinas, 2012). In Latin America, traditional instruction does not emphasize "non-cognitive skills" and little research has been completed; therefore, more work is needed to uncover the benefits for this population of students. This examination of DL skills and supplemental constructs was completed at a rural high school for poor teenagers in Paraguay, where the administration is beginning to recognize the value of fostering interpersonal, intrapersonal, and cognitive skill through their instruction.

Paraguay

Paraguay is a small, landlocked country of 6.9 million inhabitants with a strong sense of national identity and a vibrant culture (Figure 3) (CIA, 2018). The Paraguayan population consists almost entirely of Mestizos, a people of mixed European and native Paraguayan heritage (CIA, 2018). They strongly value their indigenous background, as they are proudly the only South American country which speaks two official languages: Spanish and Guarani, the local

Figure 3. Basic map of Paraguay (Global Affairs Canada, 2012)

native language (CIA, 2018). Other matters of Paraguayan pride include their beloved drink, tereré, traditional artisan craftwork such as ñanduti lace, and traditional dances such as the Paraguayan dance (Figure 4).

Figure 4. An Escuela Agrícola student drinking tereré (left), a common ñanduti decoration (middle), an Escuela Agrícola student performing the Paraguayan dance (right)

Classic Latin American culture is prevalent in Paraguay. As collectivists, they place great emphasis on the importance of group needs over individual needs. Family is always the number one priority and the first topic of conversation. Friendliness and harmony are prioritized over confrontation, even when this inconveniences an individual. Life moves at a relaxed pace and schedules or deadlines are typically viewed as mere guidelines -- the term *tranquilo* (calm, peaceful) embodies daily life. This should not be confused with laziness, however, as Paraguayans are incredibly hard-working people. Manual labor (mostly agricultural), under the country's hot sun and humidity, encompasses the occupation of most who live in rural areas.

The Paraguayan economy includes a large informal sector; Paraguayans derive their living from agriculture, especially in rural areas. Paraguay is the world's sixth largest soy producer. In addition, manioc, beans, peanuts, and maize are common exports (CIA, 2018). Because agriculture comprises 18% of the economy and 27% of the labor force, the country is susceptible to its unpredictable weather; severe droughts significantly compromise the economy (CIA, 2018). Common occupations in rural areas are agricultural, including farming and livestock, and often remain within the family (CIA, 2018).

Relationships between Poverty and Education. Poverty remains high in Paraguay despite its decline in recent years, with over a third of the population --especially those in rural areas-- below the poverty line (CIA, 2018). In several socioeconomic categories as well, Paraguay falls below the Latin American average. These include "immunization rates, potable water, sanitation, secondary school enrollment, ... income inequality and child and maternal mortality" (CIA, 2018). Several possible determinants of poverty in Paraguay exist, specifically: being a female head of household, speaking only Guaraní, being self-employed, working in agriculture, and lacking education, health insurance, sewer access, and a work contract (Duarte, 2015).

Education is paramount to overcoming poverty, yet just 47% of the population aged 25 and older have completed at least some secondary education (UNDP, 2016). Accessible education is scarce, although those students who do attend school perform relatively well. Globally, Paraguay is ranked at the 20th percentile for access to education, although it stands at the 69th percentile in learning (PNEP, 2014). The school system enforces a rigid structure; most lessons are taught as lectures with little engagement. Teachers are paid only for their time spent actively teaching, which leaves them with no time to prepare quality lessons (World Bank, 2012). Technological challenges persist throughout the country, as only 3% of homes have internet access, although most families have at least one smartphone (Thomander, 2011). Although it is often important in the school context for students to receive help

with homework from their parents or family members, many parents may not feel adequately equipped to help their children with homework because of their personal level of education (Carolan-Silva, 2011).

The damaging effects of poverty can be widespread, from social skills to future aspirations. Even in young children, low socioeconomic status can damage self perception and self-esteem (Tabernero, Serrano, & Mérida, 2017). Students and families across the world believe that success in school is the path to poverty relief and social mobility for the entire family, and thus place great importance on academic achievement (Boyden, 2013). Recent studies show that poverty can only be alleviated through improvements in education and health (Cremin & Nakabugo, 2012). However, offering an education which the poor cannot take advantage of only worsens inequality (Bonal, 2005). Peirano, Estévez, Puni, and Astorga propose a model to improve rural education (2015). Similar to Deeper Learning, it emphasizes the development of skills and competencies to succeed in the 21st century. Through an understanding that each student has their own learning process, and therefore must be the protagonist of their own education, it uses Project-Based Learning. Students develop the abilities to build new knowledge, to direct their own learning process, to persevere through challenges, and to become lifelong learners (Peirano, Estévez, Puni, & Astorga, 2015). This type of learning model has been adopted in Paraguay by Fundación Paraguaya, which educates rural teenagers as part of their plan to eliminate poverty.

Fundación Paraguaya. Fundación Paraguaya (FP), or in English, Foundation Paraguay, is an anti-poverty organization established in 1985 by social entrepreneur Martín Burt, PhD. FP runs several innovative approaches to empower people to overcome poverty. These include: a microcredit finance program, an entrepreneurial-finance education program for youth, a London NGO called Teach a Man to Fish, a multi-dimensional assessment of poverty called the Poverty Stoplight, and four financially self-sufficient agricultural high schools (FP, n.d.b). Throughout its entire approach, FP works towards the

United Nation's Sustainable Development Goals (Figure 5), especially goal number one: to end poverty in all its forms everywhere (UN, n.d.).

Figure 5. Sustainable Development Goals (UN, n.d.)

Poverty Stoplight. The Poverty Stoplight has been developed by Fundación Paraguaya as a tool to self-assess and overcome multidimensional poverty. It allows families to understand the underlying causes of their poverty, affirms their humanity by highlighting areas where they are not poor, and provides them with the resources necessary to take action to improve their own situation. Families identify the areas in which they are lacking through a simple survey that categorizes their situation on various indicators of poverty in terms of red (extreme poverty), yellow (poverty), or green (no poverty). They can then assemble their priorities, strategize, and set goals to change their reds and yellows to greens. The Poverty Stoplight is also useful in research as it gives a comprehensive picture of the poor rather than simply an income level that is above or below the poverty line. In the past 3 years, FP has enabled 16,000 families to overcome poverty (FP, 2017).

Agricultural High Schools. Another main poverty-elimination program by Fundación Paraguaya is academic. Four agricultural high schools throughout Paraguay teach students with limited resources to become "rural entrepreneurs" and escape the cycle of poverty. When students graduate after three years, they receive two diplomas: a high school diploma as an agriculture/livestock technician and as a

hotel/tourism technician (FP, n.da.). Over 60 schools in 26 countries replicate the school model of "learning by doing, selling, and earning" (FP, n.da.). The largest of FP's schools is the Escuela Agrícola de San Francisco (EASF), located in a small town called Cerrito in rural Paraguay, about 45 km north of the capital city, Asunción. Since 2003, EASF has grown in popularity, attracting students from as far as Haiti and Africa and inspiring hundreds of replications of the program in worldwide locations such as Zimbabwe and Tanzania (Escuelas Autosostenibles, 2018).

Figure 6. One of several buildings on the Escuela Agrícola campus, a retired chapel

Escuela Agrícola de San Francisco (EASF). At the Esceula Agricola de San Francisco (Figure 6), approximately 150 students learn the skills necessary to lift themselves and their families out of poverty. They split their time between the classroom and the *campo*, where they learn vocational skills within the school's different "productive units" such as livestock, agriculture, marketing, dairy processing, and running the on-campus hotel (Figure 7). The school is entirely financially self-sufficient, without charging tuition or using government funds, because of the vocational work of the students (FP, n.d.a). During their first year, students rotate through each of their vocational options, sampling the many aspects of working at the school. In their second year, students rotate through a selection of vocations after selecting their

top interests. In the third and final year, students take on greater responsibility as a "monitor" of a single area of specialization. This vocational experience provides students with a richer education experience than traditional public school, where emphasis is placed on rote memorization and reproduction of facts (Bragazzi, Siri, Khabbache, Spandonari, & Cáceres, 2016). The school model of "learning by doing" follows a Project-Based Learning approach, which is part of the Deeper Learning framework. However, prior to this study, the school had no quantitative information about their students' level of competence on DL factors.

Figure 7. Scenes from the Escuela Agrícola campus: several of the main productive units. The student-run hotel (top left), a student working in the livestock unit (top right), two students exchanging freshly collected quail eggs (bottom right), and three students working in the vegetable fields (bottom left)

Present Study

The present study took place at the Escuela Agrícola de San Francisco and was sponsored by the Fundación Paraguaya. Broadly, the goal of this study was to examine aspects of the school from the theoretical standpoint of Deeper Learning to determine how the school can better serve their students. Additionally, I sought to uncover possible connections between student competencies, professional aspirations, poverty, and academic outcomes. Two main research questions drove this research and analysis.

Research Question 1. To what extent do student social, emotional, and cognitive opportunities and skills relate to student intrapersonal and interpersonal outcomes, student achievement, and career aspirations? I hypothesized that greater opportunities for building cognitive, social, and emotional skills (such as collaboration or communication) will lead to more positive outcomes in students, including decreased aggression and higher self-efficacy, career aspirations, and academic achievement.

Research Question 2. To what extent does poverty relate to student social, emotional, and cognitive skills, intrapersonal and interpersonal outcomes, achievement, and career aspirations? I hypothesized that poverty would be negatively correlated with the measured constructs and that individuals from impoverished backgrounds would exhibit less ambitious aspirations and lower academic achievement.

Methods

Participants

91 students aged 14-20 (55 male) who attend the Escuela Agricola de San Francisco (EASF), representing 61% of the student body, participated in the research. Students from each grade level were equally represented, including 29 first year students, 32 second year students, and 30 third year students. Students were selected based on parental permission and availability of students during the time of the study. Students were assigned randomized ID numbers which were used in all data analyses to protect individual identities and maintain anonymity. Participation was completely voluntary.

Measures

Data collection. Students were asked to answer a questionnaire pertaining to Deeper Learning constructs of social, cognitive, and emotional skills as well as their academic aspirations. Professionally created and validated questionnaires were translated to Spanish, the native language of the population. These translations were reviewed by native Spanish speakers to ensure accuracy before they were used. Additionally, data on the socioeconomic background of students were collected from FP's Poverty Stoplight and data on student academic achievement were collected from the previous year's report cards.

Survey construction and translation. A self-report survey was constructed and translated to Spanish from previously validated instruments used in the US and elsewhere. The main survey was adapted from the Study of Deeper Learning Student Survey (AIR, 2016), which provides a comprehensive assessment of opportunities for DL, interpersonal and intrapersonal competencies, and school features. This survey takes 60 minutes to complete, which was greater than the amount of time that faculty were willing to dedicate to the project. Therefore, a reduced number of constructs with

fewer questions were selected based on the priorities of the school administration. These decisions were made through close collaboration with the school psychologist, Silvia Meza.

Ultimately, 12 constructs were chosen for measurement in this study; most of these were DL competencies. Specifically, DL measures included collaboration, perseverance, belonging, opportunities for complex problem solving, creative thinking, self management, locus of control, and self efficacy (see Table 1). To supplement these, validated questionnaires were selected to measure communication, aggression, empathy, and perceived stress. Question order was grouped by construct. With the exception of the aggression scale, all measures were assessed on a 4-point Likert-type scale of frequency for each item, where 1 was "never or almost never" and 4 was "always or almost always." The aggression scale was measured on a numerical frequency scale from 0 to 7 for each item, where 0 was 0 times and 7 was 6 or more times. Several open ended questions to assess student career and professional aspirations were written by myself.

Table 1. Deeper learning student competency measures by category

Cognitive	Interpersonal	Intrapersonal
Opportunities for complex problem solving	Collaboration	Perseverance
Creative thinking	Belonging	Self management
		Locus of control
		Self efficacy

In addition to the DL survey, short versions of three previously validated questionnaires were used. The aggression scale developed by Orpinas & Frankowski (2001), which focuses on overt, physically and verbally aggressive behaviors, was used. The Basic Empathy Scale (BES) self-report measure of cognitive and affective empathy was used (Jolliffe & Farrington, 2006). This scale had previously been translated to Spanish by Sánchez-Pérez, Fuentes, Jolliffe, & González-Salinas (2014) for use in Spain, so the Spanish version was used with slight language modifications to fit the local

Paraguayan Spanish spoken by students. The short version (4 item scale) of the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1994) was used to measure stress.

This entire instrument was translated to Spanish (with the exception of the BES). It was then reviewed thoroughly by professional member of Fundación Paraguaya and WPI Professor Dorothy Burt-Wolf, who is fluent in both local Paraguayan Spanish and English. She back-translated the instrument to ensure that all questions retained their original English meaning. Based on feedback from her, revisions of phrasing were made as necessary to adhere to Paraguayan Spanish customs. These revisions were reviewed and approved by Lic. Silvia Meza, FP School Psychologist. She ensured that items were both psychologically valid in relation to the constructs and easy to understand by students.

In addition to these constructs, the survey included open-ended questions regarding students' career and professional aspirations. These were written directly in Spanish in collaboration with Lic. Silvia Meza and reviewed by Dr. Erin Ottmar for external validity and by Prof. Dorothy Burt-Wolf for language accuracy. The questions seek to understand students' ideas and plans for the future, including short- and long-term career aspirations, whether they will pursue higher education, and whether they want to pursue a STEM-related career. After application of the instrument, responses were coded for these variables using content analysis (Berg, 2007).

Poverty Stoplight data. The Poverty Stoplight provides a comprehensive and actionable definition of poverty through self-assessment. Specifically, this definition of poverty includes six dimensions: income/employment, health/environment, housing/infrastructure, education/culture, organization/participation, and identity/motivation (Burt, 2013). These are broken down into a total of 50 specific indicators of poverty. Families self-diagnose their current level of poverty in each indicator by choosing a red, yellow, or green -- corresponding to extreme poor, poor, or not poor, respectively -- based on provided descriptions that most closely matches their situation. After completion of this self-

assessment, families receive a "dashboard" that provides a complete picture of their reds, yellows, and greens in each area (picture). For data analysis purposes, these colors can be translated to numbers that indicate the severity of poverty (i.e., red = 1, yellow = 2, green = 3). In this way, a quantitative measure of multidimensional poverty can be calculated from totaling the numerical value of the 50 indicators. Thus, this definition of poverty results in a scale ranging from 50 to 150, where 50 is severely poor -- red in each indicator, and 150 is completely not poor -- green in each indicator.

FP collects data on the poverty status of their EASF students' families. Shortly prior to this study, in January 2018, the Poverty Stoplight as well as general demographic measures were collected for the family of each student. In addition to the Poverty Stoplight Total Poverty score, the specific indicators of poverty included in this study were: highest level of education attained in the household, monthly family income per capita (i.e., total income generated by the family divided by the number of household members), living situation (i.e., whether the home is in a rural or urban area), and status of home ownership. This information was linked to each student through their anonymous student ID numbers.

Academic achievement. At EASF, student grades are assessed on a 5-point scale, where 1 is failing, 2 is passing, and 5 is exceptional. To compare this with the American system of letter grades, 5 = A, 4 = B, 3 = C, 2 = D, and 1 = F. Report cards from the most recently completed semester, which was the previous academic year, were analyzed to measure student academic achievement. Overall grade point average (GPA) scores were calculated for each student as the average of their grades from all classes. Thus, GPA scores can range from 1-5. The Paraguayan academic year begins in February and ends in December. Since this study took place from March-April, grades were not yet available for students in their first year at EASF. Therefore, academic achievement was calculated and used only for second- and third-year students.

Procedures

Survey application. Students completed the 20-minute internet-based survey on their smartphones (because this was the most readily available technology) during regular class time. Students were allowed to leave class in small groups of six to complete the survey under my supervision, where I was available to answer questions if they were confused. Overall, informal observation indicated that students took the survey seriously and thought about their answers. Some students found the Likert-type scale confusing at first, but understood after I explained it to them.

Data analysis. Descriptive statistics (means and standard deviations) and correlations were calculated for each quantitative variable to determine the variation of and relationship between variables. All data were checked for normality of distributions and outliers. For qualitative data pertaining to student aspirations and poverty-related demographics, frequencies of each category were calculated. A variety of analyses were performed using the gathered information including descriptives, correlations, regression models, and path analyses to predict student performance and career aspirations. This analysis was used to understand the impact of student experiences and cognitive, social, and emotional skills on their outcomes. Once complete, the information was also shared with executives of the school and foundation to aid their development of a program to enrich the curriculum for their students.

Results

Survey results

Each construct represented in the survey was tested for inter-item reliability using Cronbach's alpha scores (Cronbach, 1951). Most constructs had acceptable values of at least 0.6 or above. Two

constructs, stress and empathy, had values below this cutoff. Upon further examination, it was determined that those contained reverse-coded items, suggesting that students had a difficult time interpreting the questions. When the reverse-coded items were removed, the reliabilities for both metrics surpassed the 0.6 threshold. After dropping the reverse coded items, the number of items in these two scales were lower than desired; however, their results were retained because of the acceptable alpha levels. A summary of all constructs with the number of items and their reliabilities can be found in Table 2.

Table 2. Cronbach's alpha scores for all quantitative measures

Construct	Number of Items	Alpha
Collaboration	5	.763
Belonging	4	.614
Perseverance	4	.824
Problem Solving	7	.769
Creative Thinking	3	.698
Self Management	4	.651
Locus of Control	4	.597
Self Efficacy	4	.774
Communication	6	.616
Perceived Stress	2	.540
Empathy	4	.733
Aggression	8	.754

Deeper Learning competencies and opportunities. Descriptives, including means and standard deviations for each DL construct overall and by grade level, are given in Table 3. Mean comparisons between grade levels for each construct were tested in an ANOVA to determine differences over time, with results shown in Table 4. No significant differences were found between grades on any DL measure.

Table 3. Mean (Standard Deviation) for DL Competencies

	Overall	1st Year	2nd Year	3rd Year
Self Efficacy	3.498 (.45)	3.466 (.40)	3.578 (.36)	3.444 (.45)
Locus of Control	3.454 (.42)	3.457 (.28)	3.531 (.37)	3.369 (.56)
Creative Thinking	3.390 (.53)	3.454 (.51)	3.375 (.49)	3.344 (.60)
Perseverance	3.463 (.47)	3.414 (.36)	3.568 (.39)	3.400 (.61)
Collaboration	3.453 (.46)	3.353 (.31)	3.556 (.32)	3.440 (.65)
Self Management	3.335 (.46)	3.302 (.37)	3.367 (.43)	3.333 (.58)
Belonging	3.294 (.48)	3.250 (.37)	3.391 (.36)	3.233 (.65)
Problem Solving	3.061 (.52)	3.039 (.53)	3.063 (.49)	3.080 (.54)

Table 4. ANOVA source table for DL competencies

Source	Dependent Variable	SS	*df*	MS	*F*	*P*
Grade Level	**Self Efficacy**	.32	2	.16	.78	.457
	Locus of Control	.40	2	.20	1.15	.319
	Creative Thinking	.18	2	.09	.33	.719
	Perseverance	.54	2	.27	1.25	.291
	Collaboration	.63	2	.31	1.53	.222
	Self Management	.06	2	.03	.15	.860
	Belonging	.46	2	.23	1.02	.363
	Problem Solving	.02	2	.01	.05	.956
Error	**Self Efficacy**	17.95	88	.20		
	Locus of Control	15.43	88	.17		
	Creative Thinking	24.99	88	.28		
	Perseverance	18.99	88	.21		
	Collaboration	18.21	88	.20		
	Self Management	19.08	88	.21		
	Belonging	19.98	88	.22		
	Problem Solving	23.88	88	.27		
Total	**Self Efficacy**	1131.86	91			
	Locus of Control	1101.61	91			
	Creative Thinking	1071.02	91			
	Perseverance	1111.06	91			
	Collaboration	1104.04	91			
	Self Management	1031.37	91			
	Belonging	1007.81	91			
	Problem Solving	876.49	91			

Figure 8 depicts mean levels of each DL competency measured; it is grouped by grade level of the students. Overall, self-reported student skills are strong -- at least 3 on a 4-point scale -- and stable

across grade levels. Problem solving can be seen as the weakest of these, although it must be noted that this is the only "opportunity" measure; all others are "competency" measures.

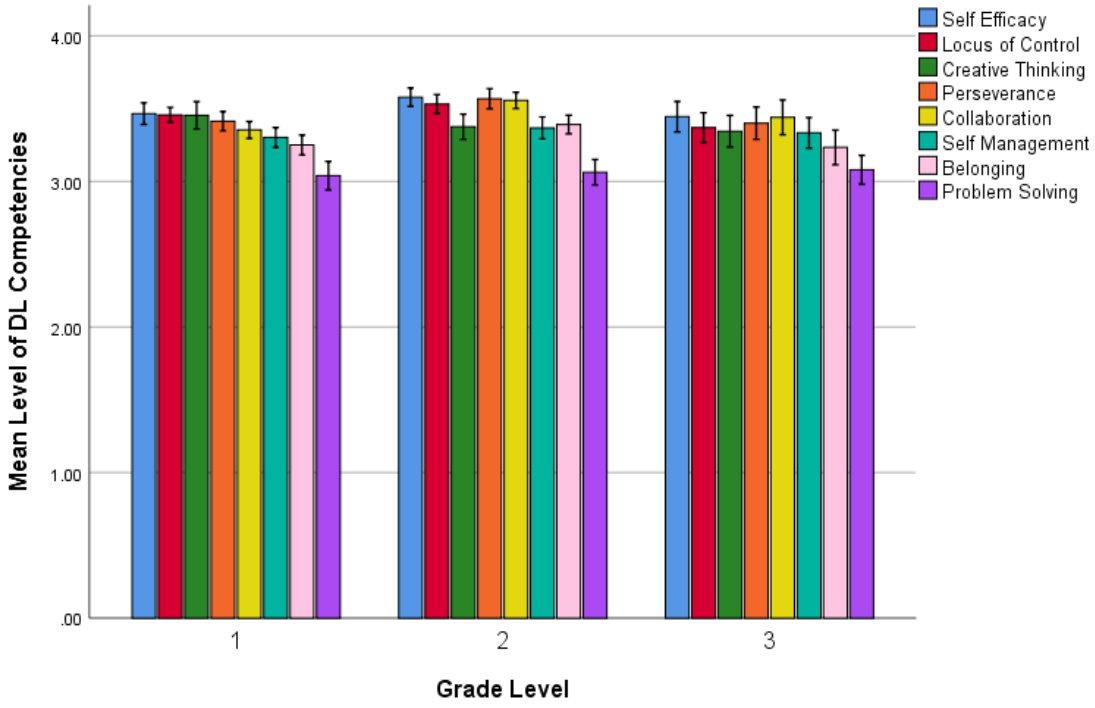

Figure 8: Mean DL competencies by grade level

Supplemental constructs. Descriptives for the measures of perceived stress, communication, empathy, and aggression overall and by grade level are given in Table 5. The changes across grade levels were tested with ANOVA two-tailed tests, with results shown in Table 6 and depicted in Figure 9. From the first to third year, student self reports of aggression increase (p = .031); meanwhile, empathy simultaneously decreases, although not at a statistically significant level. These differences were further investigated with a Bonferroni post-hoc test, which revealed a significant increase in aggression between first and third year students (p = .027), but not between second year and first or third year students. Second year students report the highest perceived stress (p = .005). Perceived stress in second year students was significantly higher than for first year students (p = . 024) and for third year students (p = .011) according to the Bonferroni post-hoc test.

Table 5. Mean (Standard Deviation) for supplemental measures

	Overall	1st Year	2nd Year	3rd Year
Perceived Stress	2.567 (.79)	2.397 (.84)	2.922 (.60)	2.345 (.81)
Communication	2.982 (.52)	3.012 (.44)	2.896 (.53)	3.046 (.60)
Empathy	3.517 (.95)	3.586 (.79)	3.703 (1.0)	3.241 (.96)
Aggression	12.12 (9.6)	8.621 (7.0)	12.50 (7.7)	15.21 (12.5)

Table 6. ANOVA source table for supplemental measures

Source	Dependent Variable	SS	*df*	MS	*F*	*P*
Grade Level	**Perceived Stress**	6.30	2	3.15	5.56**	.005
	Communication	.38	2	.19	.70	.501
	Empathy	3.45	2	1.73	1.96	.148
	Aggression	636.07	2	318.04	3.63*	.031
Error	**Perceived Stress**	49.30	87	.57		
	Communication	23.81	87	.27		
	Empathy	76.78	87	.88		
	Aggression	7631.59	87	87.72		
Total	**Perceived Stress**	648.50	90			
	Communication	824.22	90			
	Empathy	1193.25	90			
	Aggression	21493.00	90			

*** p <.01, * p <.05*

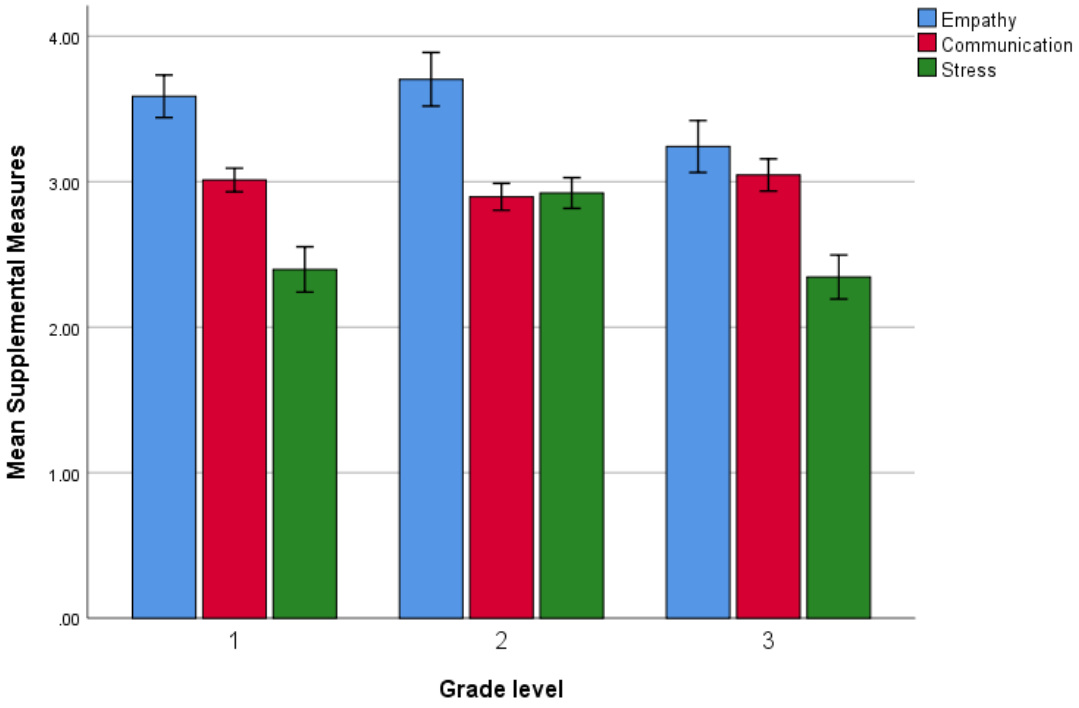

Figure 9. Supplemental measures of empathy, communication, and perceived stress by grade level. Note that empathy is on a scale of 1-5, while communication and stress are both on scales of 1-4

Aggression was calculated as the sum of answers to 8 questions on a scale of 0-7; thus, the possible range of overall aggression is 0-56. The results of this sum can be interpreted as the frequency of aggressive conduct over a period of one week -- specifically, the week prior to completion of the survey. The aggression scale can be further broken down into verbal and physical aggression. After separating these two types of aggression, it is clear that verbal aggression is much more common than physical at EASF. This is shown in Figure 10, which depicts the frequency of self-reported aggressive behaviors during the week prior to the survey. Mean verbally aggressive conduct occurred about 6 times in first year students and increased to about 10 times in third year students during one week. Physically aggressive behavior, in contrast, occurred less than one time that week for first and second

year students, and twice for third year students. These are self-reports of perpetrated aggression; victimization of this aggression was not measured.

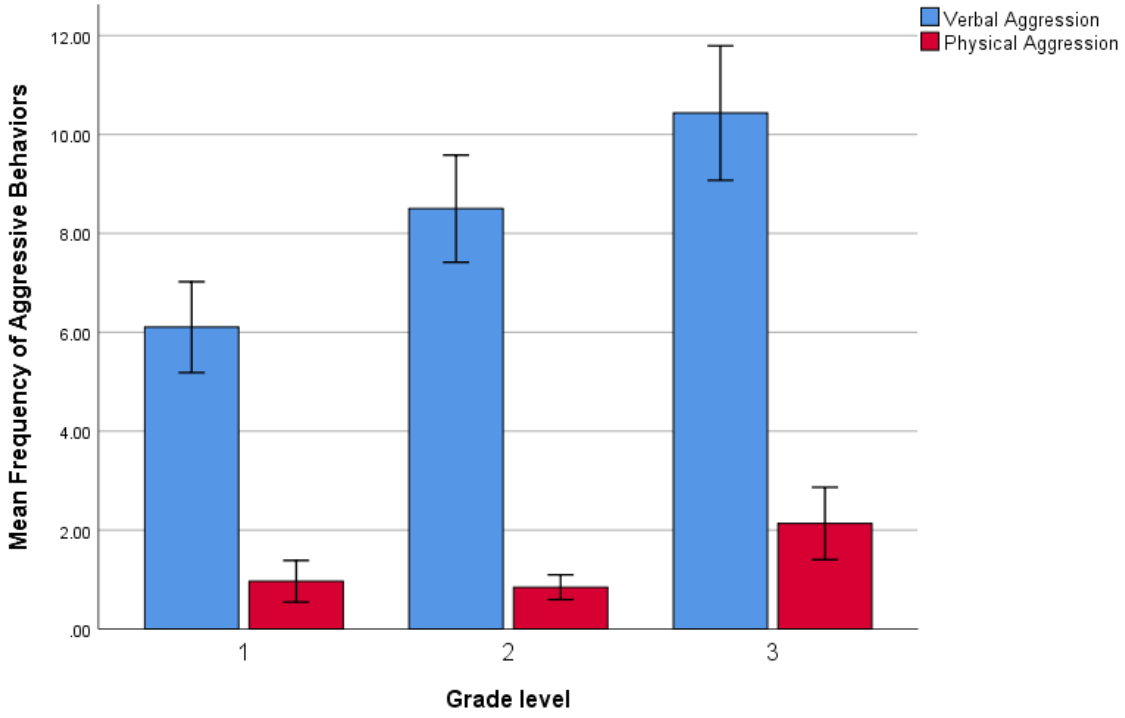

Figure 10. Mean frequency of verbally and physically aggressive behaviors reported by grade level

Future aspirations. Responses to open-ended questions regarding students' aspirations for the future were coded to determine categorical trends for several variables of interest. Frequencies for student long term career outlooks are shown in Table 7. Those professions which are directly taught at EASF are highlighted in green. Overall, 68% of students were interested in pursuing a STEM-related career; categories considered STEM-related are bolded in Table 7.

Table 7. Frequencies of student career aspirations by category. Bolded categories are STEM-related careers and green categories are those taught through vocational programs at EASF

Long term career plan	Frequency (%)
Don't know/anything	8.8
Agricultural	**19.8**
Veterinary	**19.8**
Hotel/Tourism	11
Zootechnical	**8.8**
Engineering	**9.9**
Business/Entrepreneurial/Administration	5.5
Medicine	**5.5**
Science	**4.4**
Other	6.6

These professional aspirations are broken down by grade level in Figure 11. Again, those careers directly taught at EASF through the vocational program are separated with total frequencies at the bottom. It is interesting to compare changes across grade levels, even though this is not a longitudinal study so we cannot observe the changing attitudes of individuals. Moving from the first year to the third, notice the disappearance of medicine and the emergence of zootechnical and scientific aspirations. Over the same period, agriculture and hotel/tourism decrease in popularity while veterinary aspirations grow considerably. Although one of the EASF goals is to teach students to become "rural entreprenuers," very few students cited entrepreneurship as their future plan -- only 5.5%. However, the survey did not ask directly whether students want to become entrepreneurs; these are responses to an open-ended question about what career they plan to pursue. Additionally,

entrepreneurship could be followed within any of these career paths; therefore, this percentage represents the few students who have entreprenership at the forefront of their minds.

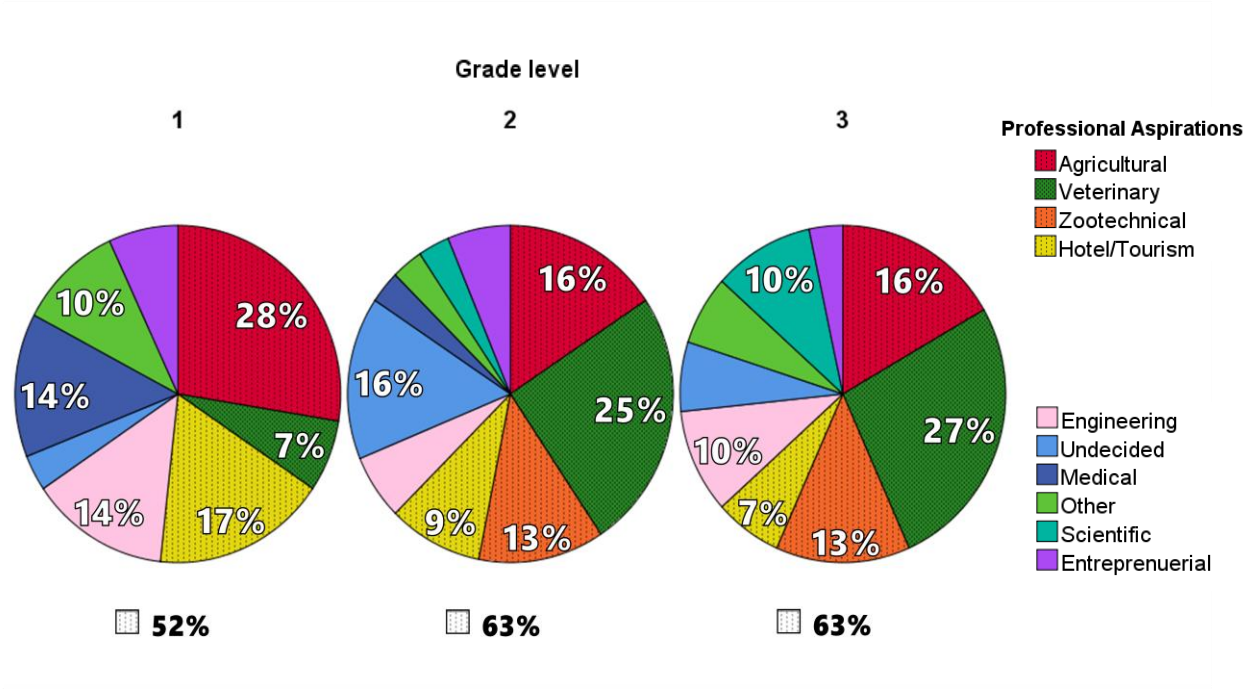

Figure 11. Professional aspirations of students based on grade level. Patterned colors -- representing agricultural, veterinary, zootechnical, and hotel/tourism aspirations -- are those that are taught directly at EASF through vocational programs; total frequencies of these are given below each pie chart. Percentages less than 7 are not shown

Most EASF students were interested in pursuing higher education. 87% of students said they plan to enroll in university after they graduate from high school. These are broken down in Figure 12 by grade level, which shows that as students get closer to graduation they were more likely to plan to attend college.

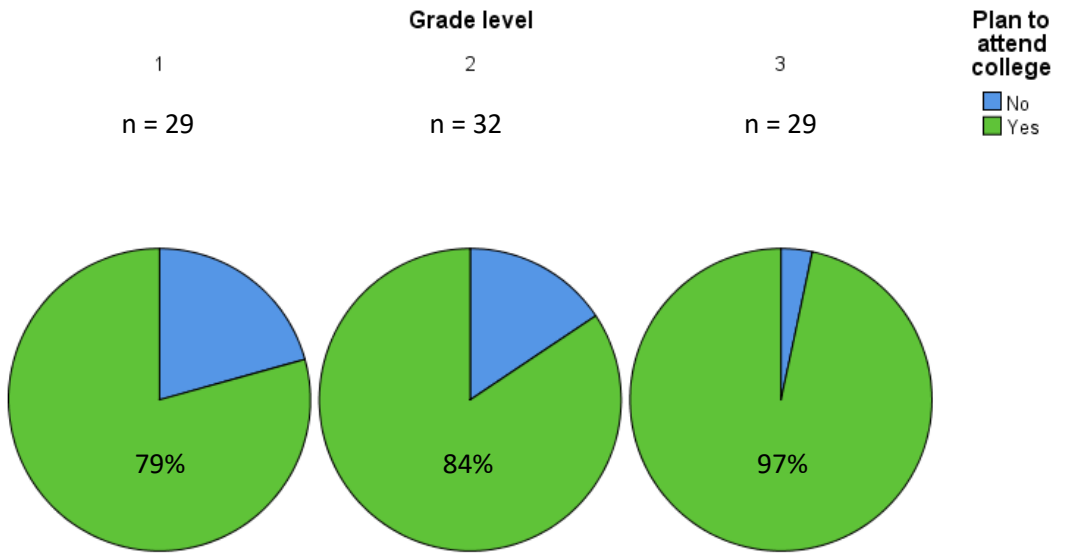

Figure 12. Percentages of students who plan to attend college after completing high school by grade level

Of the 51% of students who mentioned a specific institution that they would like to attend, most are interested in either the National University of Asuncion, a public university in the capital city, or the University of San Carlos, a private university located in Villa Hayes, the neighboring town. These are broken down by grade level in Figure 13, where it is interesting once again to compare changes between first and third year students. From the first year to the third, the percentage of students who have not made a decision about which university they want to attend reduces by more than half. The University of San Carlos and National University of Asunción make up the majority of choices overall, with both growing considerably from the first to third year. A few students said they would like to attend university abroad; the popular countries of interest were Costa Rica and the United States.

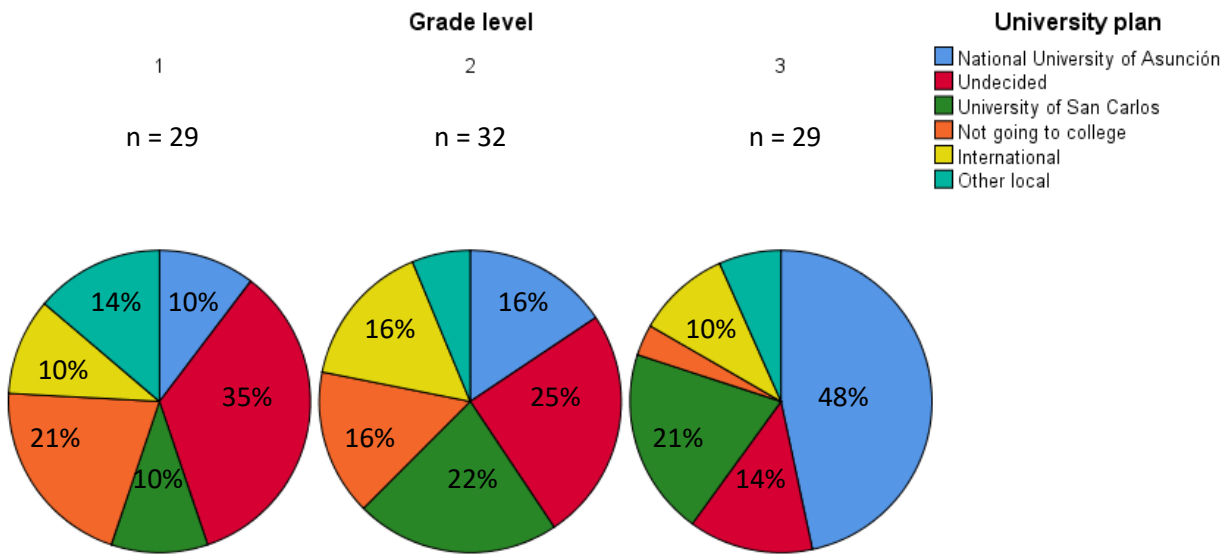

Figure 13. Universities that students plan to attend by grade level

Poverty Stoplight

Students whose families earn an income below the national poverty line represent 25% of those who participated. However, other measures of poverty indicate that this measure may not be fully representative of the poverty experienced in Paraguay. For instance, rural Paraguayans have historically been more likely than urban people to be poor. In this sample, 46% of students come from homes in a rural area, while 54% come from an urban area. Other measures of poverty include education level, where those with less education tend to be more poor, and home ownership, where those who own a home are less likely to be poor. Breakdowns of the highest educational level attained in the household and the status of home ownership are shown in Figures 14a & 14b. Here there is more variation, as about 65% of parents have incomplete secondary school education or less, suggesting that most kids are likely to be poor. Therefore, by completing their education at EASF, a majority of students are already improving their employability compared to their family and are equipping themselves to lift their families to a higher standard of living. In contrast, about the same amount (63%) of families have full

ownership of their home, indicating less poverty. This variety of results demonstrates the complex nature of poverty and the need to examine it from multiple angles.

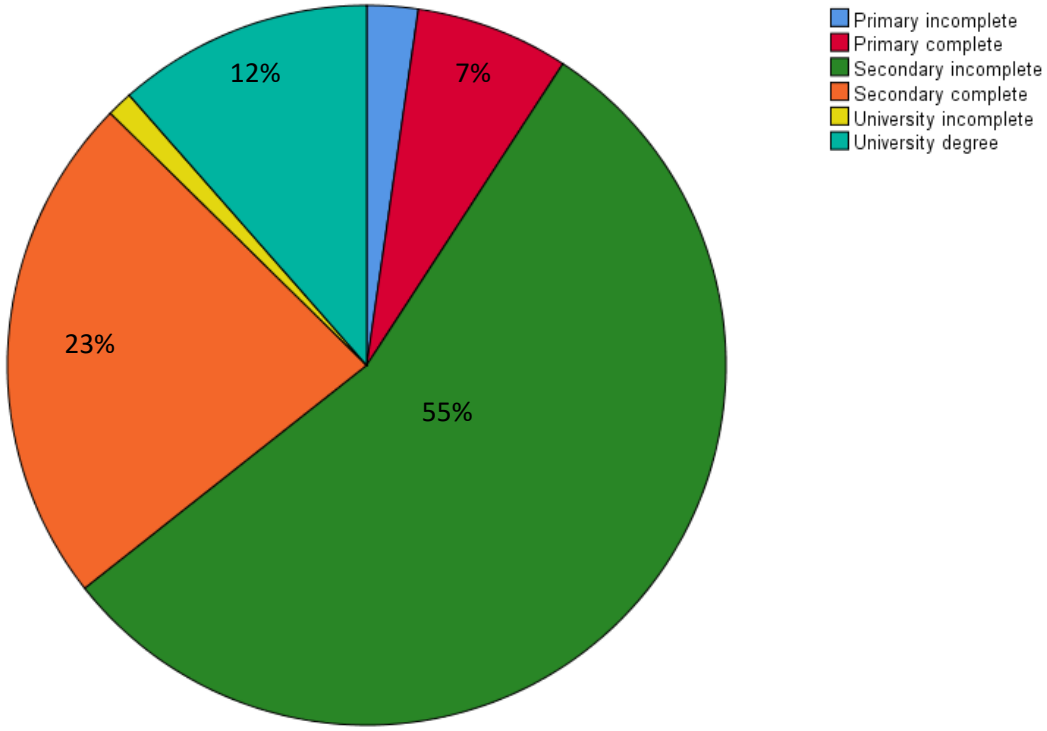

Figure 14a. Highest level of education achieved in the household

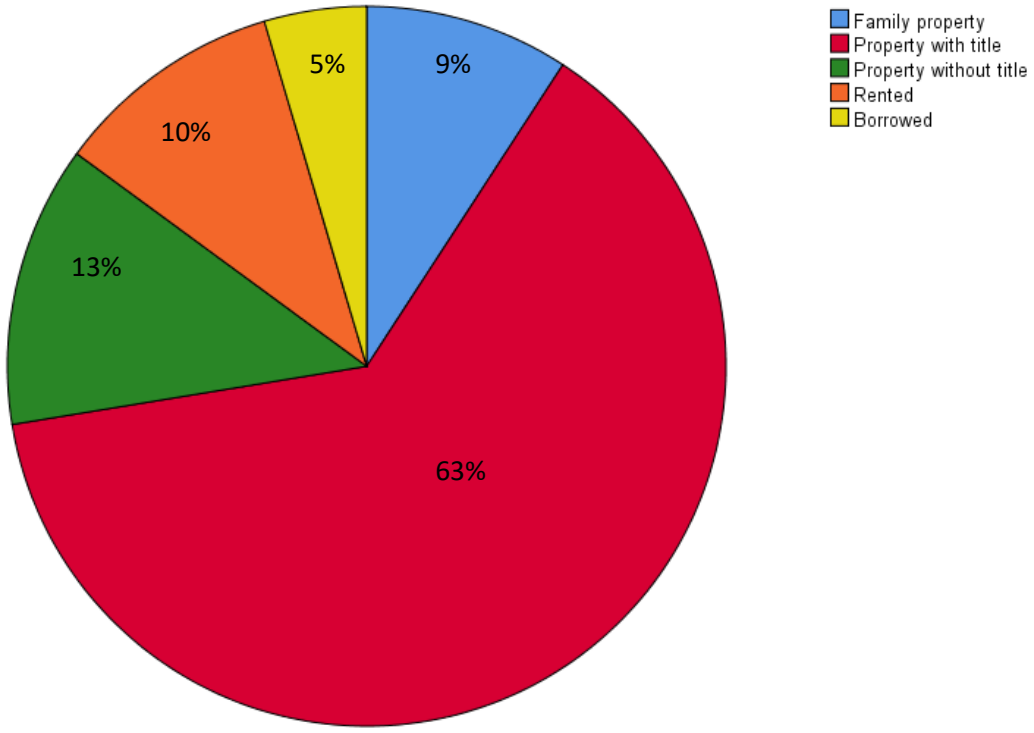

Figure 14b. Status of home ownership for EASF families

A more holistic approach to measuring many aspects of poverty in a single composite score is found in the Poverty Stoplight. Total Poverty scores of EASF families, as measured by the Poverty Stoplight (with a possible range of 50=extreme poverty to 150=no poverty), ranged from 85 to 150; the mean score was 134.7 and the standard deviation was 13.7. This is shown below in a histogram, Figure 15, to depict the frequencies of scores. In this figure, the level of poverty experienced by families can be seen as a gradient from extreme poverty to no poverty along the x-axis. Very few families in this sample are extremely impoverished, while the majority experience moderate poverty or better. It should be noted that a maximum score of 150 on this measure does not neccesarily mean "rich;" rather, it means that on each indicator of poverty the family is "not poor." These composite scores are promising, although significant variation exists among individual indicators of poverty. For example, only 8% of families lack immediate access to potable water, but 81% of families do not have a savings account or money saved in case of an emergency. Further, 80% of families are up to date on their vaccinations, but

only 34% follow a family budget plan. The details of families' scores on individual indicators are intended to help the family identify and improve upon their own weak points, while the aggregated composite scores are useful in research applications such as this, where we can understand the poverty situation of the population of EASF families. Interestingly, the total poverty score was not correlated with family income; this further supports the idea that income alone may not be a sufficient measure of poverty.

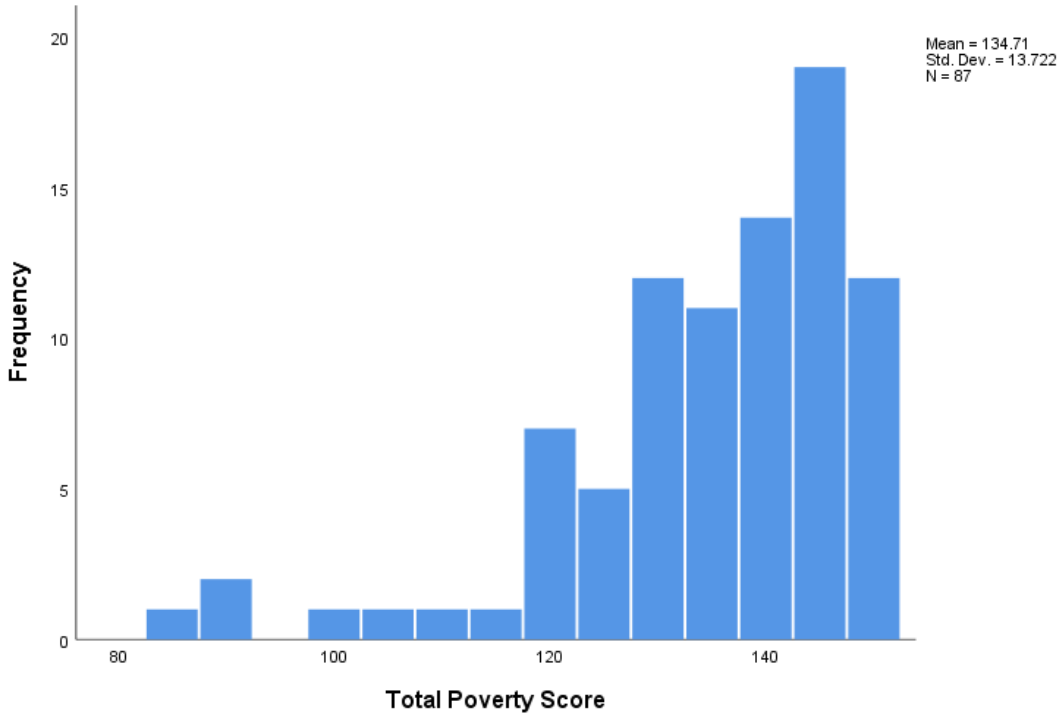

Figure 15. Histogram showing frequencies of total poverty scores of EASF families, as measured by the poverty stoplight

Academic achievement

Student academic achievement in the form of a GPA was calculated for second- and third-year students. These ranged from 2.5-5.0 with a mean of 4.178 and SD of .59 as shown in Figure 16. There was not a significant effect of grade level on GPA as tested by a one-way ANOVA, $F(1,60) = .27$, $p = .607$.

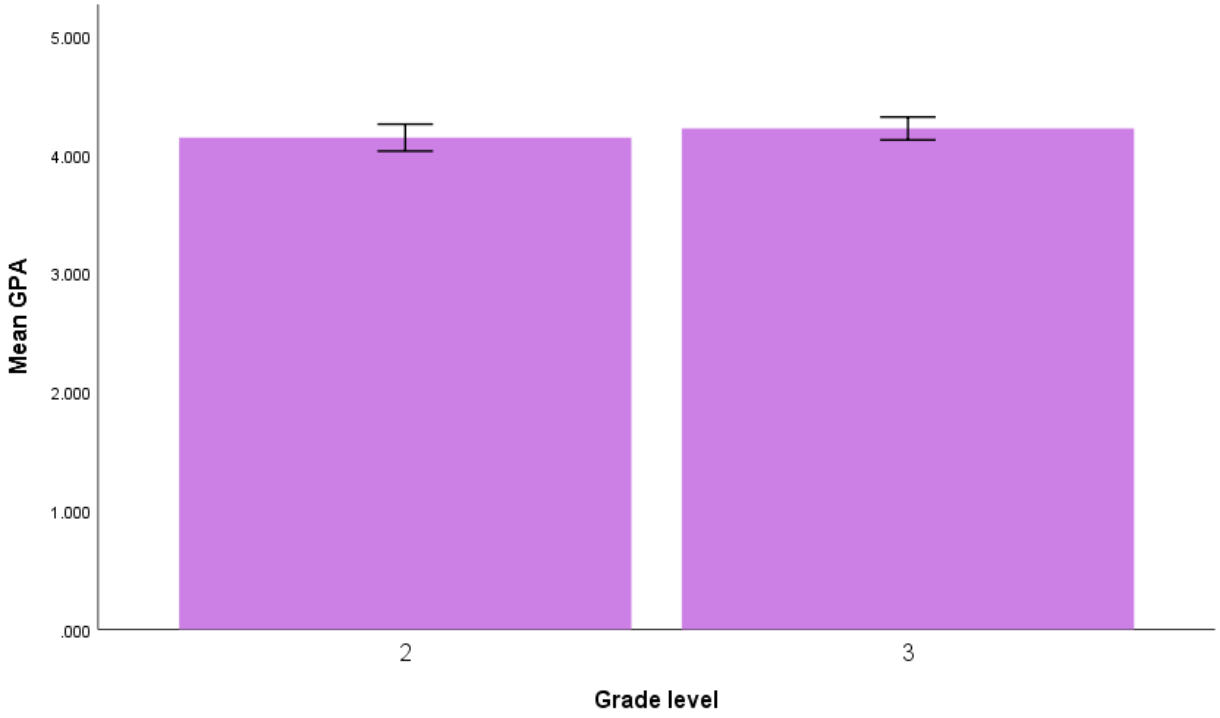

Figure 16. Mean GPA by grade level

Connections between abilities, aspirations, poverty, and achievement

In Research Question 1, I asked: to what extent do student social, emotional, and cognitive opportunities and skills relate to student intrapersonal and interpersonal outcomes, student achievement, and career aspirations? I hypothesized that greater opportunities for building cognitive, social, and emotional skills (such as collaboration or perseverance) will lead to more positive outcomes in students, including decreased aggression and higher self-efficacy, career aspirations, and academic achievement.

Correlations between survey constructs and academic achievement indicated strong connections between and among DL skills, opportunities, and supplemental measures, but little connection to academic success. Strong, positive correlations exist at the $p < .01$ level between nearly all DL constructs as well as communication; the few exceptions are still significant at the $p < .05$ level.

This indicates that collaboration, perseverance, belonging, opportunities for complex problem solving, creative thinking, self-management, locus of control, self efficacy, and communication are closely connected; where a student is strong in one, they are likely to be strong in many of the others. Supplemental skills other than communication show fewer connections. Aggression is positively correlated with perceived stress as well as its own derivatives of verbal and physical aggression. Verbal and physical aggression behave differentially with respect to stress: perceived stress is correlated at the $p < .01$ level with physical aggression but is not correlated with verbal aggression. Empathy is positively correlated at the $p < .01$ level with collaboration, and at the $p < .05$ level with perseverance and locus of control. In addition to its correlation with physical aggression, perceived stress is positively correlated with creative thinking and self efficacy. The only variable correlated with GPA is stress, a negative correlation at the $p < .05$ level. Therefore, academic success is lower for students who are more stressed, but no other connections to achievement exist. All correlations are given in Table 8.

To investigate the effect of student social-emotional wellbeing on academic and other outcomes, we ran multiple linear regression models to determine which factors may contribute to positive or negative outcomes. Specifically, the outcomes examined were aggression, self efficacy, career aspirations (measured by interest in STEM-related work), and academic achievement (GPA). For each outcome, all DL and supplemental factors were included in the regression; only a few had a significant effect.

Three factors (perseverance, locus of control, and stress) significantly predicted aggression ($F(10,69) = 1.94$, $p = .05$ with an R^2 of .22). Specifically, student aggression increased by 5.47 points for each point in perseverance, and by 3.45 points for each point in perceived stress, and decreased by 6.95 for each point in locus of control.

Table 8. Correlations between measured DL competencies and opportunities, supplemental measures, academic achievement, and poverty.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Collaboration	--																
2 Perseverance	**.705****	--															
3 Belonging	**.541****	**.472****	--														
4 Problem Solving	**.389****	**.426****	**.303****	--													
5 Creative Thinking	**.502****	**.395****	**.386****	**.510****	--												
6 Self Management	**.523****	**.566****	**.472****	**.428****	**.498****	--											
7 Locus of Control	**.576****	**.555****	**.502****	**.265***	**.424****	**.535****	--										
8 Self Efficacy	**.504****	**.611****	**.481****	**.305****	**.452****	**.637****	**.688****	--									
9 Communication	**.307****	**.253***	**.273****	**.314****	**.243***	**.340****	**.438****	**.368****	--								
10 Aggression	.100	.117	-.015	-.093	-.004	-.093	-.140	.006	.037	--							
11 Verbal Aggression	.104	.123	-0.42	-.146	-.012	-.134	-.155	-.016	-.004	**.935****	--						
12 Physical Aggression	-.089	-.061	-.017	-.099	-.041	-.118	-.193	-.054	.057	**.723****	**.526****	--					
13 Empathy	**.281****	**.224***	.196	.196	.181	.078	**.244***	.156	.098	.036	-.008	.113	--				
14 Perceived Stress	.102	.147	.016	.153	**.274****	.079	.073	**.219***	-.081	**.275****	.220	**.291****	.116	--			
15 GPA	-.032	.064	.043	-.249	-.055	.057	.017	-.008	-.085	.051	.103	-.063	-.099	**-.277***	--		
16 Household Education	.129	.085	.087	**.229***	**.346****	**.255***	.135	**.319****	.135	-.001	-.202	.073	-.115	.058	-.116	--	
17 Income	.039	-.005	-.047	-.071	.027	-.009	-.010	-.136	-.111	-.026	-.063	-.043	-.092	-.027	-.127	.160	--
18 Total Poverty	.121	.056	.042	**.245***	.118	.184	.179	**.227***	.181	**-.221***	.038	**-.283****	.041	.035	-.203	**.339****	.183

***** $p < .05$; ****** $p < .01$

Three factors (perseverance, self management, and locus of control) significantly predicted self-efficacy ($F(6,73) = 23.78$, $p < .0001$, $R^2 = .66$). More specifically, student self efficacy increased by 0.27 points for each point in perseverance, 0.27 points for each point in self management, and 0.53 points for each point in locus of control.

A logistic regression to predict STEM related careers (categorized as STEM-related or not STEM-related) found no significant factors.

Only a single factor (perceived stress) predicts academic success significantly ($F(1,59) = 4.89$, $p = .031$, $R^2 = .077$) . Student academic performance decreased by 0.214 points for every point in perceived stress. Although this effect seems small, it is meaningful as it accounts for almost 8% of the variance in academic success. Considering how many different factors can influence academic success, a factor that accounts for 8% of variance may be important.

In Research Question 2**,** I asked: to what extent does poverty relate to student social, emotional, and cognitive skills, intrapersonal and interpersonal outcomes, achievement, and career aspirations? I hypothesized that poverty would be negatively correlated with the measured constructs and that individuals from impoverished backgrounds would exhibit less ambitious aspirations and lower academic achievement.

Correlations between measures of poverty and measured survey constructs indicated very little connection between poverty and outcomes. Out of all twelve intrapersonal and interpersonal skills and outcomes, only five had a correlation with any measure of poverty. Family income was not correlated with any other construct, even other measures of poverty. Maximum education level achieved in the household was positively correlated at the $p < .05$ level with opportunities for complex problem solving and self management, and at the $p < .01$ level with creative thinking and self efficacy. Total poverty points, as measured by the poverty stoplight, was correlated with education level at the $p < .01$ level.

Total points was correlated at the $p < .05$ level positively with opportunities for complex problem solving and self efficacy, negatively with (overall) aggression, and correlated at the $p < .01$ level negatively with physical, but not verbal, aggression. Importantly, there were no correlations between academic success and any measure of poverty.

In this analysis, we repeated the regressions from Research Question 1 with the addition of poverty as a predictor for the same student outcomes. We found no significant regression equations for any outcome with poverty as a predictor. In predictions of aggression, self efficacy, and STEM-oriented aspirations, no changes occur when any measure of poverty is added as a factor. The regression on GPA does change when adding poverty. As seen in Research Question 1, in a regression of all DL and supplemental measures, we found that only perceived stress predicts GPA, $\beta = -.214$, $p = .031$. When poverty is added as a predictor, the influence of perceived stress on GPA was attenuated but remained marginally significant ($\beta = -.266$, $p = .050$), and poverty ($\beta = -.008$, $p = .243$) was not a significant predictor of GPA. To further explore the potential influence of poverty on stress and GPA, we repeated the regression model adding the interaction between poverty and stress. We found no effect of the poverty-stress interaction on achievement.

Discussion

As an initial diagnostic of student abilities, these results provide a foundation for EASF administration and faculty to understand and foster student development. Overall, both DL and supplemental measures are generally above the median score, suggesting that they are at normal and good levels. Because no differences in DL measures exist across grade levels, the school is at a good starting point where it seems that DL skills can be maintained throughout students' three years at EASF. This consistency indicates that students may already have acquired much of these skills before their first

year, although there seems to be little to no growth between years, leaving clear room for improvement. As EASF begins to foster the development of these skills more actively, we hope to see an increase in abilities that can be retained and reinforced across grades.

The only statistically significant changes from first to third year are an increase in aggression and changes in stress, a concerning combination. Many possible explanations for this observation exist. For instance, third year students may report higher levels of aggression than first year students because they are more self-aware and self-evaluative of their actions. Or, these students may tend to be more honest as they get older. Without another measure of aggression, it is difficult to separate real effects from those that may be altered due to the limitation of self-report. If these effects are not merely due to self-report, the increase in aggression could represent a normal developmental trajectory of adolescence.

Most student aspirations are related to the skills taught in the EASF vocational program. These career paths are in the agricultural, veterinary, zoo technical, and hotel/tourism fields. The shift from medical careers in the first year to veterinary and zootechnical in the second and third may represent the influence of the school on students' outlook. It is interesting that across first to third year students, agriculture and hotel/tourism decrease in popularity despite being major focal points at EASF. Perhaps students enter the school because they are interested in these fields, but after the significant experience provided in the field find that they prefer something else. STEM-related careers, when defined in the context of Paraguay, are quite popular among students regardless of background. Students who want to become scientists and veterinarians have high aspirations in a country where most work in manual labor or service industries for their entire lives.

Additionally, 87% of students surveyed plan to pursue higher education. In Paraguay, where most children do not finish sixth grade and universities are not readily accessible to the masses, this is

an important result. Most of those who want to attend college see it as important to their career. This very high aspiration exists regardless of student background. However, in an open-ended question about what might prevent the student from pursuing higher education, 49% of students cited financial barriers as their main concern.

While 25% of participating students live officially below the poverty line, other poverty measures indicate that over half of students are poor. Most families have attained low levels of education -- less than secondary school completion. Therefore, by completing their education at EASF, a majority of students are already improving their employability compared to their family and are equipping themselves to lift their families to a higher standard of living.

In an examination of the links between abilities, achievement, and aspirations, several important conclusions can be drawn. Strong inter-correlations exist between and among DL skills, as expected, as well as with communication, suggesting its importance for Deeper Learning although it is not an official DL skill. Empathy's positive correlation with collaboration, perseverance, and locus of control indicate its importance to DL as well. Furthermore, strong correlations within DL measures indicate that students are more likely to be either high on many or low on many skills, rather than a random mix. Therefore, a focus on fostering a few skills may bolster more than just those of focus.

Perceived stress appears in many important correlations. Aggression overall and physical aggression positively correlate with stress, while verbal does not; this indicates that the few students who are physically aggressive are also more stressed. Further support for this phenomenon is in the regression which predicts aggression with perseverance, locus of control, and stress. Interestingly, stress also correlates positively with creative thinking and self efficacy, indicating that students who are more stressed may think more creatively and have higher self efficacy. In a regression predicting self efficacy, stress is almost a significant factor with $p = .051$, alongside perseverance, self management,

and locus of control at $p < .05$. Finally, the only significant factor affecting academic outcomes is stress, which appears in both a regression of GPA and a negative correlation with GPA.

Overall, these findings moderately support the hypothesis that greater DL and supplemental skills will contribute to more positive outcomes such as decreased aggression, higher self efficacy, and greater academic achievement. The most influential of these factors appears to be stress, which supports the large body of research evidence that stress affects many aspects of life. Some DL factors affect some of these outcomes, although it is less consistent. Perseverance, locus of control, and self management appear particularly valuable in decreasing aggression and increasing self efficacy. There may be little benefit seen for GPA from DL skills because they are both relatively stagnant across grade levels. As DL and supplemental skills are strengthened, we would expect to see academic achievement increase.

When we add poverty as a factor in these analyses, not much changes. The fact that family income was unrelated to anything else measured, even other forms of poverty, indicates that it may not be a useful poverty indicator. But, it may also indicate equality among all students at EASF in terms of their skills and outcomes, regardless of their family's financial situation. Family education level and total poverty points were in closer agreement. Students from less impoverished backgrounds had higher opportunities for complex problem solving, a greater sense of self efficacy, better creative thinking and self management abilities, and were less likely to be aggressive -- both physically and overall. All other measures, such as empathy, communication, collaboration, locus of control, perseverance, and more, had no correlations with any measure of poverty. This lack of findings is a positive finding in itself because it means that students are largely unaffected by poverty despite their increased risk for more negative outcomes. It seems that EASF acts as an effective buffer against the harmful effects of poverty through services and opportunities that reduce poverty's threat to its students.

Particularly important is the lack of relationship between academic achievement and poverty, since typically poorer children tend to do worse in school or drop out altogether. The general absence of the negative effects of poverty demonstrates students' considerable resiliency and supports the mission of EASF -- to provide equal opportunities to succeed for impoverished students. Although many EASF students come from impoverished backgrounds, their abilities, aspirations, and achievements are comparable to their better-off peers. This is great news for poor kids because it means that EASF levels the playing field, allowing even at-risk students to succeed equally. Since EASF is not a public school, the students who attend are self-selecting; these are students who took the initiative to attend a high quality technical school in order to gain employable skills. EASF pulls kids out of situations where this initiative to succeed would be likely compromised (i.e., in public schools) and instead provides them with an enriching environment where they can succeed.

At the end of April, I presented the results of this work for the EASF administration and faculty. Here, many of my results were validated by anecdotal experiences and observations that the staff shared about the students. For instance, the high perceived stress seen in second year students was explained by attendees in two possible ways. First, they explained the increased pressure on this group of students compared to their younger and older counterparts. During the second year, students choose their vocational specialty which they will follow for the remainder of their time at EASF. For many, this is a difficult and stressful choice to make. After learning about the increasing rate of aggression in each year, faculty proposed the idea that second year students may feel increased stress -- in this case, victimization -- from the high aggression of third year students directed towards them. It was noted that there have been observed instances of aggression and violence particularly among third year students, supporting the survey results. A few weeks prior to the study, a group of third year

students destroyed the school's video security system. The staff felt that aggression in third year students may be a learned behavior wherein first and second year students are treated aggressively by third year students, thus learning to behave this way when they reach their third year. This could be brought about by the leadership structure within vocational paths: third year students become the "monitors" in their chosen vocational path, which gives them the authority to lead their younger co-workers. It is common for monitors to delegate and supervise tasks without "getting their hands dirty" themselves; EASF staff explained this as a cultural phenomenon -- learned both from older peers and from Paraguayan society. The staff hopes that by correcting this "bad leadership" they may be able to both increase productivity of their students and decrease aggression.

Equipped with an understanding of the importance of DL skills and their students' current level of competency, the EASF staff formed a committee to begin working to improve the school. I attended the committee's first meeting, where they prioritized their needs and brainstormed strategies to address them. The top priorities were to reduce aggression and develop skills of communication, collaboration, and complex problem solving. Additionally, the staff prioritized the development of entrepreneurial skills and broadening students' awareness of potential career opportunities.

In collaboration with the director of the school, Hugo Florentin, and the school psychologist, Silvia Meza, several recommendations were developed for EASF to begin to improve outcomes for students. With the commitment of the school director and psychologist already earned, the recommendations given reflect their top priorities. These recommendations were presented to the staff and were met with approval and enthusiasm. As a starting point from which the staff may develop their own curriculum most suited to the unique context of EASF, these recommendations represent a small fraction of the possibilities for EASF's future. Four overall recommendations are outlined below.

1. *Annual application of the survey at each of Fundación Paraguaya's schools*. After the study ended, I shared with Silvia Meza the full instrument that I used for data collection as well as instructions for calculating each variable from the survey responses. Through discussion with her about the results within the unique context of the school, we agreed that slight modifications should be made to the instrument to improve its accuracy and the relevance of its results. These changes include the rewording of negatively-phrased items (which would then be reverse scored), as Cronbach's alpha scores indicated that students could not reliably answer these types of questions, and specific additions to reflect the unique vocational aspects of the EASF curriculum. She plans to continue to develop and utilize the survey every year at EASF and at each of the three sister schools run by FP. This will allow the school and FP to track students' progress and observe the impact of their newly developed programs on students' skills, outcomes, and aspirations.

2. *Improvement to student leadership abilities and DL competencies*. The school has already incorporated a significant amount of Deeper Learning concepts into their overall curriculum through the "learning by doing, selling, and earning" model. These are particularly apparent in the vocational aspect of the program but less emphasized in the classroom. Thus the project-based learning approach encouraged by DL and the stable levels of DL competencies already acquired by the students place EASF at a good starting point for deepening student learning. EASF administrators have placed special importance on teaching good leadership practices to their students after learning about the observed rates of aggression. Additionally, they agree that fostering DL competencies by providing DL opportunities will likely contribute to better outcomes and better prepare students for life after high school. This is an important focus that will inform future curriculum development across disciplines.

3. *Introduction of a guidance counselor position*. In the United States, guidance counselors support students to help them plan their future through advice about higher education and career

options. In Paraguay, no such role exists. The most similar position is a counselor who provides discipline to misbehaving students and counseling to troubled students. Therefore, the introduction of a counselor who can assist students in planning their futures may expand their awareness of the variety of career options available to them.

4. Increased variety of entrepreneurship opportunities. Currently, students participate in only a small fraction of the business that they help to sustain -- they are involved mainly in the production and marketing of products. In order to give students a more complete picture of what it means to be an entrepreneur, they should be exposed to the many aspects of running a business. Specific suggestions include participation in the construction of annual budgets and their realization, internships with the school administrator, and frequent meetings with section managers about the financial progress of the section.

Several limitations to this study should be taken into account when interpreting the results. The limitations of self-report apply to DL and supplemental measures, as well as career aspirations, which were gathered from a survey. The reliability of these data could be strengthened through the inclusion of faculty ratings of student skills and behaviors. On these measures, responses seemed potentially higher than expected (i.e., there were very few negative responses). Further evidence of students' unwillingness to answer negatively is in the reverse-coded questions, which drove reliability alpha scores to zero. After exclusion of the negatively phrased questions, reliability scores returned to normal. The most likely explanation for this is cultural; in Paraguay it is considered rude to say "no" to a request or to tell someone something that they do not want to hear. Furthermore, the fact that I personally administered the surveys could have influenced the integrity of the results. Either they might have been unwilling to tell the truth to me, a foreign visitor who studies psychology, or they might have felt

motivated to tell me what they thought I would want to hear. However, variation in responses and high alpha scores of reliability suggest that the results are not random.

The cross cultural aspect of this study presented other unique challenges. Because the main survey (from the Study of Deeper Learning) was developed in the context of traditional U.S. schools, it requires further adaptation to the context of Paraguayan culture and especially the unique school environment of EASF. For example, items that measure opportunities for complex problem solving revolve around topics such as carrying out experiments in class. However, lab facilities are not the only environment in which these opportunities can be created. EASF students likely have plenty of complex problem solving opportunities in their vocational work, but this was not assessed because the construct had been defined in an inappropriate context for this school. Future revisions of the survey will take into account these context and phrasing complications.

Another cross cultural complication occurred before the study could be implemented. In accordance with United States Institutional Review Board standards for the protection of minors in research, parental permission was gathered before survey administration. However, in Paraguay it is not standard practice for schools to request parent permission to collect information from their students. Additionally, communication with parents, especially parents of EASF students, is challenging. Since EASF is a boarding school, some parents live on the other side of the country on a remote cattle ranch. Mail service in Paraguay is unreliable, email is not used by the general population, and students who live far away go home only once or twice a year. Many parents are illiterate. Thus, this unusual communication raised many suspicions with parents. Eventually, almost 75% of parents did give their permission for their child to participate; students whose parents did not consent were excluded from the study.

Informal observations taken while students completed the survey indicated that most students took the survey seriously and thought about their answers. A few rushed through the questions with minimal effort; these were excluded as outliers. There was some confusion regarding the Likert-type scale -- many had never seen a scale of this type before -- but this was resolved once I explained it. Most students completed the survey on their smartphones, rather than a computer. This was both convenient and inconvenient, because smartphones were much more accessible than computers but still relied on the scarce internet connection. Viewing the survey on a phone also made comprehension of the Likert-type scale less intuitive because of the small screen size. In the future, the survey might be better collected on paper instead of electronically because of these drawbacks.

This study provides a cross-cultural assessment of important non-cognitive factors in high school education, especially those emphasized by Deeper Learning methodology, their interactions with poverty, and their influence on student outcomes, academic achievement, and aspirations. Since little work of this nature has been done in Paraguay or South America, we may begin to understand the unique cultural implications of a DL approach as more research is completed. Future work should ensure that constructs are defined within the context of the population studied as much as possible. Additional measures that do not rely on self-report, such as teacher evaluations of student behavior, may provide supplemental evidence to enhance result reliability. The aggression scale could be supplemented by the victimization scale, developed by the same authors (López & Orpinas, 2012), to assess the extent to which students feel victimized by reported or unreported aggression.

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Appendix I: Full Survey in English

Unless otherwise indicated, questions are answered on a Likert-type 4 point scale of frequency, where 1 is never or almost never, and 4 is always or almost always.

Belonging:

People here notice when I'm good at something.

The teachers here respect me.

I feel like a real part of my school.

Other students in my school take my opinions seriously.

Collaboration: *When I work with a group....*

I share my ideas with the group.

I pay attention when my teammates talk.

I learn from other people in my group.

I finish my part of a group project on time.

I consider everyone's ideas.

Perseverance:

I am a hard worker.

I finish what I begin.

I achieve goals even if they take a long time.

I do a careful and thorough job.

Opportunities for complex problem solving: *In my classes....*

I use what I've learned to solve new and different problems.

I combine many ideas and pieces of information into something new and more complex.

I discuss possible solutions to problems with other students.

I use math to solve real-world problems.

I form hypotheses by asking questions and defining problems.

I plan and carry out experiments.

I use equations to help me analyze data or solve a problem.

Creative thinking:

I am able to come up with new and different ideas.

I like to think of original solutions to problems.

I come up with new ways to do things.

Self-management:

I feel good about my ability to learn whatever I want or need to know.

I set long-term goals for myself.

I can learn effectively on my own.

I finish my tasks on time.

Communication:

I feel comfortable when I have to talk in public.

I can express my thoughts to other people when I'm angry.

If I feel that I'm right, I say so, even if others don't like it.

If someone close to me (a friend, relative, etc.) does something that I don't like, I tell them.

I find it easy to initiate a conversation with a stranger.

If I am invited to an event that I don't want to attend, I can easily reject the invitation.

Locus of control:

I believe that whether or not I get to be a leader depends mostly on my ability.

When I make plans, I am almost certain to make them work.

I believe that when I get what I want, it’s usually because I worked hard for it.

I believe that my life is determined by my own action.

Self efficacy:

Even when things are tough, I can perform quite well.

I believe I will be able to overcome challenges.

I know I can do many different things well.

I believe I will be able to reach my goals.

Perceived stress: *In the last month...*

How often have you felt that you were unable to control the important things in your life?

How often have you felt confident about your ability to handle your personal problems? ǂ

How often have you felt that things were going your way? ǂ

How often have you felt difficulties were piling up so high that you could not overcome them?

Aggression*: *For each question, answer how many times you did that behavior during the last 7 days.*

I teased students to make them angry.

I said things about other kids to make other students laugh.

I encouraged other students to fight.

I pushed, shoved or kicked other students.

I called other students bad names.

I threatened to hurt or to hit someone.

I got into a physical fight because I was angry.

I got angry very easily with someone.

*Answered on a scale from 0-7, where 0 is 0 times in the past week and 7 is 6 or more times in the last week.

Empathy **:

The emotions of my friends don't affect me much. ǂ

After being with a friend who is sad about something, I usually feel sad.

Seeing someone angry does not affect how I feel. ǂ

I get caught up in other people's feelings easily.

I can understand my friend's happiness when s/he does well at something.

I can often understand how people are feeling even before they tell me.

I am not usually aware of how my friends are feeling. ǂ

**Answered on a scale from 1-5, where 1 is completely disagree and 5 is completely agree.

Professional Aspirations***:

What are you thinking about doing after you finish high school?

Do you know what you want to do after you finish high school? (Yes/No/Maybe)

If yes, what is your plan after you finish high school?

If yes, how sure are you that you really will do what you plan to do?

If you are not sure of your plans after finishing high school, what are 3 potential plans that interest you?

After you finish high school, do you plan to enroll in university or higher education?

If so, where do you plan to enroll?

If not, why not?

After you finish high school, what type of job do you want to have?

Eventually, what career path do you want to follow?

***Open response questions

[†] Reverse-scored questions; excluded from these analyses

Appendix II: La Encuesta en Español (Full Survey in Spanish)

A menos que se indique lo contrario, las preguntas se responden en una escala de frecuencia de tipo Likert con 4 puntos, donde 1 es nunca o casi nunca, y 4 es siempre o casi siempre.

Pertenecer:

Las personas que se encuentran en mi colegio se dan cuenta cuando yo sé hacer bien algo.

Los profesores aquí me respetan.

Me siento parte de la escuela y de mi grupo.

Los otros alumnos de mi escuela consideran mis opiniones.

Colaboración: *Cuando yo hago trabajo en grupo...*

Comparto mis ideas con el grupo.

Presto atención cuando mis compañeros hablan.

Aprendo de otras personas en mi grupo.

Termino mi parte del trabajo a tiempo.

Considero las ideas de todos.

Perseverancia:

Soy muy trabajador.

Termino lo que empiezo.

Logro metas aún si toman mucho tiempo.

Trabajo con dedicación y termino lo que comienzo.

Oportunidades para Resolver Problemas Complejos: *En mis clases...*

Uso lo que he aprendido para resolver problemas nuevos y diferentes.

Combino muchas ideas e informaciones para crear algo nuevo y más complejo.

Converso sobre posibles soluciones a problemas con los otros estudiantes.

Uso la matemática para resolver problemas que se encuentran en el mundo real.

Formulo hipótesis a través de la formulación de preguntas y la definición de problemas.

Planeo y llevo a cabo experimentos.

Utilizo ecuaciones para ayudarme a analizar datos o resolver problemas.

Pensamiento Creativo:

Puedo inventar ideas nuevas y diferentes.

Me gusta pensar en soluciones originales a los problemas.

Invento nuevas formas de hacer las cosas.

Autodirreción:

Soy optimista con respecto a mis habilidades para aprender cualquier cosa que quisiera o necesito saber.

Establezco metas a largo plazo para mí.

Puedo aprender de manera efectiva por mi cuenta.

Termino mis tareas a tiempo.

Comunicación:

Me siento cómodo si tengo que hablar en público.

Puedo expresar mis pensamientos a otras personas cuando estoy enojado.

Si siento que estoy en lo cierto, lo digo, aunque no les guste a los demás.

Si alguien cercano a mí (amigo, familiar, etc) hace algo que no me gusta, se lo manifiesto.

Me resulta fácil iniciar una comunicación con un extraño.

Si me invitan a una reunión a la cual no tengo ganas de ir, la rechazo con facilidad.

Centro de Control:

Creo que si llego o no a ser líder depende mayormente de mi habilidad.

Cuando hago planes, estoy casi seguro de que los cumpliré.

Creo que cuando obtengo lo que quiero, generalmente es porque trabajé duro para lograrlo.

Creo que mi vida está determinada por mis propias acciones.

Autoeficacia:

Incluso cuando las tiempos son difíciles, puedo desempeñarme bastante bien.

Creo que podré superar los desafíos con los cuáles me enfrento.

Sé que puedo hacer bien muchas cosas.

Creo que podré lograr mis metas.

Estrés Percibido: *Durante el mes pasado...*

He sentido que no podía controlar las cosas importantes en mi vida.

He sentido seguro acerca de mi capacidad para manejar mis problemas personales. ǂ

He sentido que las cosas en mi vida se están yendo bien. ǂ

He sentido que mis dificultades se ha acumulado tanto que no podría superarlas.

Agresividad*: *Por favor, elige cuantos veces hiciste cada conducta durante los 7 días pasados.*

El número de veces que he tentado a mis compañeros para hacerles enojar, en los últimos 7 días, es...

El número de veces que he dicho cosas a mis compañeros para hacerles reír de otros compañeros, en los últimos 7 días, es...

El número de veces que animé a otros estudiantes a pelearse entre si, en los últimos 7 días, es...

El número de veces que he empujado, golpeado, o pateado a otro estudiante, en los últimos 7 días, es...

El número de veces que he referido a otro alumno con una groseria, en los últimos 7 días, es...

El número de veces que amenacé con herir o golpear a alguien, en los últimos 7 días, es...

El número de veces que me metí en una pelea física porque estaba enojado, en los últimos 7 días, es...

El número de veces que me enojé fácilmente con alguien, en los últimos 7 días, es...

*Se responde en una escala de 0-7, donde 0 es 0 veces en los últimos 7 días, y 7 es 6 o más veces en los últimos 7 días.

Empatía:**

Las emociones de mis amigos/as no me afectan mucho. ǂ

Después de estar con un amigo/a que está triste por algún motivo, suelo sentirme triste.

Ver a alguien enfadado/a no afecta a mis sentimientos. ǂ

Los sentimientos de los demás me afectan con facilidad.

Puedo comprender la felicidad de un amigo/a cuando él o ella haga algo que le sale bien.

A menudo puedo comprender cómo se sienten los demás incluso antes de que me lo digan.

No suelo estar consciente de los sentimientos de mis amigos/as. ǂ

**Se responde en una escala de 1-5, donde 1 es totalmente en desacuerdo y 5 es totalmente de acuerdo.

Aspiraciones Profesionales***:**

¿Qué piensas hacer luego de terminar el colegio?

¿Sabes que quieres hacer despues de terminar el colegio? (Sí/No/Quizás)

De ser así, ¿cuál es tu plan luego de terminar el colegio?

De ser así, ¿cuán seguro estás de que realmente harás lo que planeas hacer, luego de terminar el colegio?

Si no está seguro de tus planes luego de terminar el colegio, ¿cuáles serían 3 potenciales planes que te interesan?

Luego de terminar el colegio, ¿planeas inscribirte en la universidad o un programa de educación superior?

De ser así, ¿donde piensas inscribirte?

De no tener planes de inscribirte en la universidad o un programa de educacion superior, ¿cuál sería el motivo de no hacerlo?

Luego de terminar el colegio, ¿qué clase de trabajo piensas buscar?

Eventualmente, ¿qué profesión te gustaría practicar?

***Preguntas con respuestas abiertas

[t] Ítems de pregunta inversa